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Ex Parte Filing

Ms. Marlene Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band – GN Docket No. 12-354

Dear Ms. Dortch:

Recent filings in this docket request the FCC to revise certain rules relating to mobile operations in the 3550-3700 MHz band (the "3.5 GHz band").[1] In conjunction with these submittals, QUALCOMM Incorporated ("Qualcomm") respectfully requests that the Commission consider relaxing the emissions limits that apply to 3.5 GHz CBSDs and End User Devices because the current limits would require 4G LTE and 5G New Radio ("5G NR") devices operating with channel bandwidths greater than 10 MHz to engage in power backoff, thereby diminishing the quality of mobile broadband service that could otherwise be provided to consumers. This issue has been raised previously in this docket, but is even more pressing today since the band is becoming increasingly important for both 4G LTE and 5G NR operations.[2]

The current 3.5 GHz band emissions limits require mobile devices using a channel bandwidth wider than 10 MHz, such as 20 MHz, to implement 4 dB (and greater) Additional - Maximum Power Reduction ("A-MPR") to comply. Requiring the transmit power level for 20 MHz operations to be reduced by 4 dB would significantly diminish signal coverage, the quality of service, and the usefulness of the band for mobile operations.

The Commission should revise the 3.5 GHz band emissions limits as Qualcomm requested in its October 2015 comments in this docket to appropriately support 4G LTE and 5G NR channels wider than 10 MHz.[3] In order to enable 20 MHz-wide and 40 MHz-wide mobile broadband operations at the same transmit power levels at which 10 MHz LTE operations are permitted, the FCC should revise Rule Section 96.41(e)(1) to provide 20 MHz operations with an additional 10 MHz on both sides of the operating channel edge (*i.e.*, 20 MHz total) to achieve the -25 dBm/MHz limit and provide 40 MHz operations an additional 30 MHz on both sides of the

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1 *See, e.g.*, CTIA Petition for Rulemaking (filed June 16, 2017).

2 *See* CTIA Petition for Reconsideration (filed July 23, 2015) at 2, 5-6; *see also* FCC, Petitions for Reconsideration of Action in Rulemaking Proceeding, GN Docket No. 12-354, Report No. 3029, 80 Fed. Reg. 59705 (Oct. 2, 2015).

3 *See* Qualcomm Comments on Petitions for Reconsideration (filed Oct. 19, 2015) at 4-6.

transmit channel edge (*i.e.*, 40 MHz total) to achieve the -25 dBm/MHz limit. The -13 dBm/MHz limit, which the FCC initially proposed to apply throughout the band, would apply from the channel edge up until the point where the -25 dBm/MHz limit begins, and protect adjacent channel operations within that portion of the band to the same -13 dBm/MHz emissions level that has worked well in other mobile bands, as the FCC has acknowledged in this proceeding.[4]

Below we provide suggested revisions to Rule Section 96.41(e) to implement our proposed revision.[5] Qualcomm is not asking to modify the additional -40 dBm/MHz protection level in paragraph (e)(2) of Rule Section 96.41 the FCC adopted to protect users outside the 3550-3700 MHz band.[6] Hence, Qualcomm's proposal will not have any increased impact on users in the adjacent bands. The revisions provided below would enable wider bandwidth operation at the same power level permitted for 10 MHz channels but only for channels that are away from the 3550 MHz and 3700 MHz band edges. 3.5 GHz operations in channels on or near the band edge would continue to be constrained by the -40 dBm/MHz additional protection level requirement.

(e) *3.5 GHz Emissions and Interference Limits*:

(1) *General protection levels*. Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) for a 10 MHz operating channel shall not exceed -13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and ~~less~~ greater than 10 MHz below the lower SAS assigned channel edge for a 10 MHz operating channel, the conducted power of any emission shall not exceed -25 dBm/MHz. For a 20 MHz operating channel, the conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0-20 MHz above the upper SAS-assigned channel edge and within 0-20 MHz below the lower SAS-assigned channel edge; at all frequencies greater than 20 MHz above the upper SAS assigned channel edge and greater than 20 MHz below the lower SAS assigned channel edge, the conducted power of any emission shall not exceed -25 dBm/MHz. For a 40 MHz operating channel, the conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0-40 MHz above the upper SAS-assigned channel edge and within 0-40 MHz below the lower SAS-assigned channel edge; at all frequencies greater than 40 MHz above the upper SAS assigned channel edge and greater than 40 MHz below the lower SAS assigned channel edge, the conducted power of any emission shall not exceed -25 dBm/MHz.

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4 *See 3.5 GHz Report & Order* at ¶ 176 ("We proposed applying the long-standing OOBE attenuation requirement of 43 + 10 log (P) dB (equivalent to -13 dBm / MHz), to all emissions from CBSDs and End User Devices outside of any channel assigned by the SAS.").

5 The proposed revisions also correct what Qualcomm believes to be a typographical error in the second sentence in subsection (e)(1).

6 *See* 47 C.F.R. § 96.41(e)(2) ("the conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/MHz").

For operating channels between 10 MHz and 20 MHz and between 20 MHz and 40 MHz, linear interpolation may be used to determine the point of transition from -13 dBm/MHz to -25 dBm/MHz. The upper and lower SAS assigned channel edges are the upper and lower limits of any channel assigned to a CBSD by an SAS, or in the case of multiple contiguous channels, the upper and lower limits of the combined contiguous channels.

These suggested revisions, which are consistent with the manner in which the mask is defined in 3GPP specifications,[7] recognize that wider bandwidth channels require a wider roll-off bandwidth and allow the emissions mask to scale with bandwidth.[8]

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For the reasons set forth herein, Qualcomm respectfully requests that the Commission consider these proposed revisions to enable consumers to enjoy the full potential benefits of this band for mobile broadband.

Respectfully submitted,

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7 *See* Nokia Petition for Reconsideration (filed July 23, 2015) at 10-12 (requesting the FCC to align its rules with the emissions levels in 3GPP standards).

8 In 3GPP standards, the boundary between -13 to -25 dBm/MHz emissions level is scaled to bandwidth for single carrier and for contiguous intra-band carrier aggregation. The rule text proposed herein follows this convention by allowing interpolation to be used to determine the appropriate point of transition from -13 dBm/MHz to -25 dBm/MHz for operating channels between 10 and 20 MHz and between 20 and 40 MHz.